

# Workload Analysis in Firewood Collection Activities by Gender in Kailari Rural Municipality of Kailali District, Nepal

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**Abstract**-Lack of energy source alternatives and miserable economic condition is forcing Nepal to rely heavily on biomass fuel for a long time. Socio-economic set up in patriarchal society is one of the main causes of increased workload of women in unrecognized household and non-household activities which shows adverse effect in their health and socialism. In this perspective a study was conducted to analyze the workload among gender with respect to the firewood collection activities in three different wards of Kailali District, Nepal. Pretested structured questionnaire were administered to 75 stratified-random sampled households along with 3 focused group discussion and key informant interview within September-November 2017. Descriptive and inferential statistics tool were used as and when needed to determine the factors associated with the subject matter. Five major works were found to be involved in a journey of firewood; collecting, carrying, slicing, arranging and burning. Different workload distribution was found for each but on average more work burden was found on women (Women-42.932%, Both-30.674% and Men-26.394%). Further study revealed that poor income source and improper agriculture were the major reason for respondent not being able to shift/improve energy source but proper training, awareness & agricultural promotion will help to improve energy source and decrease workload.

**Keywords:** agriculture, assessment, awareness, energy, firewood, gender, workload

## 1 INTRODUCTION

Wood fuel is a fuel such as Firewood, Charcoal, Chips, Sheets, Pellets and saw dust. In many areas wood fuel is the most easily available form of fuel, easily collected and economical for the poor households. As per the Census 2011, nearly 4 million out of 5.4 million households in Nepal are still using traditional biomass as energy source for cooking [1]. Essentially all of those users of traditional fuels reside in developing countries and most of them in rural areas; low income and lack of alternative energy sources explains their choice of traditional energy source. According to WHO [2] about 53 percent of people in low and middle-income countries rely on polluting fuels for cooking, which include biomass coal and kerosene. Along the energy source fuel woods is also an income source for poor household in

South Asian region.

As cited by ADB [3] 80 percent of primary energy supply in Nepal is fulfilled by biomass where 77 percent is supplied by firewood till 2008/09. Dependency in fuel wood is massive in Nepal because of economy and poor development in the sector of alternative energy. Estimated theoretical sustainable annual yield of fuel wood in Nepal is 25.8 million tones or on an average 2.8 tons per ha of forest. However, only 10.8 million tones or 42 percent of the theoretical supply is accessible [4]. In Nepal firewood is burned in an open fireplace and is very energy inefficient and creates high indoor air temperature and air pollution [5]. Reason for people in rural areas using high amount of fuel wood are; useful for both heating and cooking purpose, obtained from waste woods, no transportation required and easy availability.

Gender refers to the socially structured characteristics of women and men such as; norms, roles and relationship between groups of women and men. People born with sex i.e. male or female and they are taught appropriate behavior including, how to behave, how to create relation, how to interact with same or other sex within household, communities and workplace. Both

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men and women plays multiple role in society, but the major difference according to Moser is that women generally play triple role (i.e. productive, reproductive, socio-economic) sequentially, balancing each within their time frame. Whereas, men usually play their role sequentially i.e. focusing on a single productive role. Poor rural women play important roles as unpaid family workers, hired labors, income earners, savers of expenditures, and major care takers of family health and nutrition. So, for these duties women had to gather, manage and provide energy to house [6]. Mahat [7] in study for Gender Energy and Poverty revealed that even after availability of infrastructure and facilities in this era till now women's workload remains heavy. For fire wood collection in Nepal women are found to be involved more than man. Nepalese women are involved in household activities including collection of firewood from forest (about 93% women), contributing about 66 percent of their lifetime in collecting firewood energy [8].

Socio-economic set up in patriarchal society is one of the main causes of increased workload of women in unrecognized household and non-household activities which shows adverse effect in their health and socialism making women weaker to align with man in the society. They are generally bound to their responsibilities at home and have fewer opportunities than men for earning income and participating in decision making and governance. Not only collection of firewood but use of firewood is completely done by women, which affect women's health. Inadequate interventions & development strategy in rural Nepal for uplifting women and decreasing their workload is due to lack of adequate data and findings on workload analysis for firewood.

More than a need, energy per se is absolutely essential to deliver adequate living conditions, food, water, health care, education, shelter and employment. Wood collection consumes considerable amount of time and distances covered over difficult terrain. According to Sinha [9] and Mahat [10] in Nepal women are found to walk over 20 km per journey in search of wood, whereas Mahat [7] also found increased concern of women towards their workload regarding the collection of firewood as it consumed long time to walk and search for firewood. Wan et al. [11] found that, shrinking access to fuel wood near home is becoming a pressing reality in many developing countries and is taking more time for women to collect firewood which is restricting them to be involved in other activities. Women also have to suffer back problems from carrying heavy woods loads (20 kg are not usual) on their head as well as less recognized

threats of rape and beating [12], [13]. Uterine prolapsed in many cases among rural women in Nepal is attributed to carrying heavy firewood and similarly women often face a risk of miscarriage with such heavy wood ([14], [15], [13]).

#### **Objectives:**

The main objective of this study is to analyze workload for firewood collection activities by gender in different wards of Kailali, Nepal; whereas specific objectives are as follows:

1. To determine Preference of energy source, sources of fire wood and willingness to change
2. To explore the activity profile and workload for collection of firewood among gender.
3. To explore problems and possible intervention on agriculture and energy sector.

## **2 MATERIALS AND METHODS**

Field survey was conducted from September to November- 2017 and primary information was collected from 75 households (25 from each Ward) through pre-tested questionnaire interview in three different wards (Hasuliya-01, Pabera-05 and Ratanpur-07) of Kailali rural municipality of Kailali District, Nepal. In order to collect data and further information, open checklist was prepared for focus group discussion (FGD) and Key informant interview (KII). Study conducted 3 different FGDs (In each ward) where different stakeholder took participation and KII with sever key informants within study area such as from Community Forest Group-Coordination committee, Cooperatives, District forest office, Rural municipality, Mothers group, women cooperatives.

For analysis of coded, tabulated information both quantitatively and qualitatively, simple statistical tools as well as descriptive methods were used. Main analysis part was to determine workload among gender for firewood along with correlation, chi-square and cross-tabulation between different factors with significances. Problems and needs that were restricting or will be allowing them to improve their energy source were determined by participatory approach.

### 3 RESULTS AND DISCUSSION

#### 3.1 Preference of energy source, sources of fire wood and willingness to change

**Table 1: Preference of energy source, sources of fire wood and willingness to change**

Particulars		Frequency	Percentage
Household Main source of energy	Firewood	31	41.3
	Firewood & LPG	7	9.3
	Firewood & Biogas	35	46.7
	All	2	2.7
<b>Total</b>		<b>75</b>	<b>100.0</b>
Household source of Firewood	Community Forest	44	58.7
	Both Community forest & Flood residue	31	41.3
<b>Total</b>		<b>75</b>	<b>100.0</b>
Sector in which respondent will invest their time if saved from firewood collection	Agriculture	51	68.0
	Business	13	17.3
	Other	11	14.7
<b>Total</b>		<b>75</b>	<b>100.0</b>
Frequency of Firewood used by respondent	Regular	30	40.0
	Often	36	48.0
	Sometime to supplement LPG	9	12.0
<b>Total</b>		<b>75</b>	<b>100.0</b>
Respondent willing to change their energy source	Yes	39	52.0
	No	36	48.0
<b>Total</b>		<b>75</b>	<b>100.0</b>

(Source: Household Survey, 2017)

In the study area 41.3 percent off household were found to be solely depended on firewood to meet their energy requirement likewise, 46.7 percent of total household were using firewood and biogas to fulfill energy need. According to CBS [16] more than one third population of Nepal use firewood as usual Source of household energy, also Bhattarai [17] and GoN [18] found that majority of Nepalese household depend on firewood for energy. Similarly, in a survey done by NESS [19] in Terai firewood consumption was found to be 6206 kg/yr whereas LPG was 0.30 Cyl/yr. Bardhan et al. [20] also found that 74% of rural household use firewood as the main source of energy for cooking and heating.

Majority of household were found to be using community forest as their major source of firewood contributing 58.7 percent of total household whereas 41.3 percent of household collect from both community forest and flood residue, where Bhattarai [17] also found in Nepal out of fuel wood used 2/3 is collected from public forest and remaining from private forest and pasture land and dependence on public forest is 53.2 percent on average similarly, NESS [19] found that in Terai 60.87 percent people collect from neighboring community forest followed by 30.43 percent from private forest and 5.43 percent from Governmental forest.

Forty percent of respondent household were found to be regular user of firewood where as 48 percent were using it in often basis and only 12 percent use sometime to supplement LPG. Which is because every household can't afford appropriate alternate energy source like Bio-gas/LPG so has to depend on firewood on regular basis. Majority of respondent showed their keen interest to invest their time from firewood collection into agriculture contributing 51 percent of total household. Saving time from firewood collection will help them to invest their precious time more on productive work and this will lead to agricultural promotion in the study area. 52 percent of respondent show their interest to change their energy source to easier and cleaner one.

#### 3.2 Workload analysis

**Table 1: Workload analysis**

S.N.	Work	Men (%Cases)	Women (%Cases)	Both (%Cases)
1.	Collecting firewood in forest	14.67	21.33	64.00
2.	Carrying wood from forest to home	36.00	13.33	50.67
3.	Firewood slicing	73.33	14.67	12.00
4.	Arranging firewood in home	6.67	73.33	20.00
5.	Using firewood at home(Cooking)	1.3	92.00	6.7
<b>Total</b>		<b>131.97</b>	<b>214.66</b>	<b>153.37</b>
<b>Average workload</b>		<b>26.394</b>	<b>42.932</b>	<b>30.674</b>

(Source: Household Survey, 2017)

In 64 percent of cases women and men were found working together to collect woods from forest. In 21.33 percent cases women were found to collect woods alone likewise in 14.67 percent men were found alone. This result signifies that respondent mostly work together to collect woods form forest but if it comes in case of solo collection in more cases i.e. 21.33>14.67 women are found to have burden for firewood collection. Similarly, NESS [19], found that in Terai work division for firewood collection was Female (25.00), Male (5.43) and both (61.96%) where also according to a research by Practical

Action [21] in South Asian region there was greater involvement of women for firewood collection in comparison to man, on an average 56.7 percent of time required for fuel collection falls under women, which is about 374 hours per year, in compared to 286 hours for men.

Study also revealed that women and men work together to carry wood from forest as in 50.67 percent cases and in 36 percent of cases men were found bringing wood home alone but using vehicles like bull cart but in 13.33 percent of cases women were found bringing wood home carrying on head. This may be because in majority of cases if wood has to be brought from far forest male go by using bull cart but if has to be brought from nearer area (3-4 km) women used to carry on head.

Wood slicing is regarded as masculine work so it was mostly performed by men i.e. 73.33 percent cases. In 14.67 percent of cases women were found to be slicing wood alone and in 12 percent cases they work together. This signifies in slicing women has not that much of workload. As expressed by one of the women respondent during survey "Male don't allow us to slice wood as it is a masculine work but we used to slice wood in their absence" (Source: Personal Communication, 2017).

As arranging woods in not thought to be that much of important or laborious job in most of cases women's were assigned. As data speaks in 73.33 percent of cases women arrange firewood in home in comparison to 6.67 percent cases where man does this work. Similar result was found by Mahat [7] on workload for arranging firewood in home (Women-71%, Men-3% and Both-26%). Using firewood for cooking is thought to be women's traditional job as same result was found in study as in maximum cases i.e. 92 percent women use firewood in home in comparison to 1.33 percent cases where men were found to be using firewood. Supportive result was found by Skutsch [22] and Cecelski [23] as, using biomass for energy consumes considerable time and labour for women allowing limited time for economic activities. As cited by Mahat [7] women are fully responsible for household chores such as carrying firewood, fetching water, cooking and carrying children in Nepalese society.

Though different workload distribution was found for different work as listed above, on an average more work burden was found on women contributing 42.932 percent of total work. Men were found to be contributing only 26.394 percent and they both contribute about 30.674 percent.

Focus group discussion and key informant interview revealed that poor income source and improper agriculture were the major reason for respondent not being able to shift/improve energy source but proper training & awareness, agricultural promotion will help to improve energy source and decrease workload.

### 3.3 Participatory problem-need assessment

**Table 2: Result of Summarized participatory problem ranking on agriculture and energy sector form three different wards:**

Rank	Needs	Marks
1.	Supply of Agricultural inputs and Ag promotion	4
2.	Proper awareness and training	3
3.	Bio-gas and LPG subsidy	2
4.	Proper functioning of CFUG	1
5.	Proper road to forest	0

(Source: Household Survey, 2017)

Result revealed, Lack of agricultural inputs and market structure was the major problem faced by respondent of study area followed by limited awareness and training that were restricting them to shift/improve energy source and have fruitful agriculture.

**Table 3: Result of Summarized participatory needs/solutions ranking for problems on agriculture and energy sector form three different wards:**

Rank	Problems	Marks
1	Lack of agricultural inputs and market structure.	6
2	Limited awareness and training	5
3	Limited irrigation facility.	4
4	Unemployment.	3
5	Scarcity of fuelwood.	2
6	Improper functioning of CFUG	1
7	Difficult access to forest.	0

(Source: Household Survey, 2017)

Result revealed that proper agricultural input supply, agriculture promotion (market facility and other structure) was the major needs of the respondent from study site followed by awareness and training which will help them to improve their agriculture, economic status and move toward safer and cleaner energy source.



## 4 CONCLUSION

From above findings it is concluded that till now majority of people use firewood as their major energy source which is significant with several health problems on them due to carrying and burning of firewood. Women still have a burden of workload to fulfill energy requirement of house showing adverse effect in their health and socialism. Poor economic condition, unemployment, lack of training & awareness and less productive agriculture are the major problems restricting respondent to improve/shift their energy source but proper awareness & training, agricultural promotion and employment will help them to improve their economic status and improve /shift their energy source to safe and clean energy. Time saved by them from firewood collection will be utilized to other economic activities like agriculture and business.

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